

Carroll (A.L.) with the author's regards

An Address on State
Medicine.

BY

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AN ADDRESS ON STATE MEDICINE.

By ALFRED LUDLOW CARROLL, M. D., Secretary of New York State
Board of Health.

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STATE Medicine, in its most comprehensive sense, embraces all the relations of the medical profession to the public, including in its scope medical jurisprudence, medical education, and sundry international as well as national considerations, in addition to public hygiene. But in popular estimation the term now has a narrower significance, and is applied more especially to the practical administration of sanitary science; to the protection of the public health by legally-constituted effort.

Even with this more limited definition, preventive medicine may present its claim to be regarded as at once the oldest and the most vigorous of the now almost too numerous sisterhood of specialties in our profession. Moses was the prototype of the modern health officer. His minute instructions, put forth under divine sanction in the guise of religious observances, were in reality simply a code of sanitary ordinances suitable for a rural community, which many of our local boards of health might do well to follow. His injunction of circumcision was doubtless intended to prevent balanitis and blennorrhœa, without a prophetic foreknowledge of its prophylactic efficacy against all the reflex neurotic results of "preputial irritation." His introduction of the "dry earth system" was a distinct protest against the abomination of leaching midden-pits and cesspools, although the urban method of paving streets renders his suggestion of "paddles" impracticable in civilized municipalities at the present day; but even in this his supposed invention was in reality

presented by the author



borrowed from the instincts of the lower animals, which, from a time whereof the memory of archæologists runneth not to the contrary, have utilized their sewage without pollution of their water-supply or contamination of the ground atmosphere. It is more than probable that "leprosy" and "plague," in their Scriptural acceptation, were generic terms, comprising not only a number of parasitic and other contagious cutaneous disorders, but also what we now euphemistically call "specific" disease; and it is quite certain that the Israelitish leader anticipated some of the most modern theories as to isolation, disinfection, and antiseptis. Indeed, throughout Leviticus, Numbers (in which we have the beginning of vital statistics, with the first accurate census enumeration), and Deuteronomy, excellent regulations are formulated for the prevention of many dietetic, diathetic, zymotic, and enthetic diseases.

As history descends through the intervening centuries, we find here and there, amid the crudities and superstitions of successive generations, gleamings of a sounder sense, seeking for the causes of disease, and relying rather on prevention than on cure. *Ætiology*, which must ever be the very foundation of preventive medicine, has had no more keen and observant student than Hippocrates, whose treatise on "Airs, Waters, and Places" stands to-day in favorable comparison with the most learned lucubrations on the causation of malarial and other endemic disorders published and puffed by our contemporaries. But even he, whose writings constitute the earliest systematic records of medicine, was in all probability largely a collator of the observations made by his predecessors in the *Asclepia*, or "temples of health," which had been accumulated for generations before his time, the temple at Cos having, according to most commentators, been the principal source of his studies. Plato, his contemporary, alludes disparagingly to Herodicus, the tutor of Hippocrates, as having injured his own health and that of many of his patients by his introduction of gymnastics into medical practice, a method which, adopted by the "father of medicine," and fostered by Celsus and his later disciple, Paulus *Ægineta*, is the origin of the very modern panacea of

friction and massage, even almost to its minutest details. Galen, as we all know, wrote voluminously on hygiene; and throughout the teachings of Oribasius, Aëtius, Ægineta, and other authors from the fourth century B. C. to the twelfth century of our era, the means of preserving health occupy a prominent place. Indeed, the "dogmatic" or "rational" school, to which these masters gave birth and maintenance, as opposed to the "empirics" and "methodists," set a seldom-followed example to our medical colleges of to-day in its insistence on the importance of a knowledge of the collateral sciences, and of careful study of ætiology and of the effects of dietetic, meteorological, telluric, and industrial influences, either directly upon health, or indirectly by increasing individual susceptibility to disease.

The crystallization of the doctrines of the Dogmatics was formed in the famous school of Salerno, which bore upon its seal the motto "*Civitas Hippocratica*," and which flourished from the ninth century until as late as 1811. Hence emanated, at the beginning of the twelfth century, the "*Regimen Sanitatis*," whose quaint Latin rhymes were familiar in the mouths of all physicians of the Middle Ages, and, indeed, were household words until comparatively recent times.

It must be admitted that, with few exceptions, these earlier teachings related chiefly to personal hygiene; but, after all, this is the essential basis of the wider sanitary science of modern civilization, which may be concisely defined as applied physiology, and which must found all its operations upon the physiological requirements of individual health. The household is an aggregation of individuals whose conjoined physiological needs are more difficult to satisfy than those of a single person; but what is necessary for all is necessary for each. The municipality is an aggregation of households, demanding still more artificial aid to provide for the conditions of health for each of its many component residents. Hence have arisen the principles and practice of sanitary architecture and sanitary engineering, ranging from the vagaries of the "practical plumber" to the science-guided triumphs of skill exemplified in numerous public edifices and sewage-disposal systems which,

in the present controversial frame of the architectural and engineering mind, it would be invidious to particularize.

But it is evident that these health-preserving arts are ancillary to physiological and pathological knowledge. Neither the architect nor the engineer can solve all the factors of the problems presented, however expert in their respective vocations. The sanitarian must be primarily an accomplished physician, versed in the nature and causes of disease, and cognizant of the physical and chemical laws which regulate the normal functions of the human organism. He must, however, superadd to his medical lore some theoretical, if not practical, knowledge of architecture and engineering. He need not necessarily be able to build a city or to construct a system of sewers; but he should know how such things ought to be done, and how to discover defects therein, and to suggest remedies which the technical skill of his colleagues can carry into effect. Disregard of the essentially medical character of the foundation on which all sanitary studies must be based has led, on the one hand, to an almost ludicrous doctrinarianism, or, on the other hand, to an even more mischievous depreciation of the most obvious hygienic precautions. An architect with a keen eye for the beauty of "sky lines," but with sublime ignorance of the oxygen-requirements of the respiratory organs or the law of diffusion of gases, will evolve from his inner consciousness a plan of ventilation resting on the somewhat violent assumption that carbon dioxide, being heavier than atmospheric air, ought to flow out through a hole in the floor; the specific gravity and pathogenic properties of volatilized organic products of respiration and perspiration being undreamed of in his philosophy. A self-constituted "sanitary engineer" will expatiate upon the imminent peril of the "sewer gas" arising from six inches of waste-pipe under a trapped basin, or dilate on the danger of retaining in a sleeping-room for a few hours the water in which one's hands have been washed. An excellent analytical chemist, without medical experience, dealing with products rather than with processes, may undertake to measure pathology by so many milligrammes to the litre, and declare water potable

by arbitrary standards of nitrates, albuminoid ammonia, or oxygen absorbed, according to his admiration for Frankland, Wanklyn, or Tidy, though a dozen sewers may empty into it under his very nose; while, *per contra*, the enthusiastic bacteriomania would condemn the purest spring unless it were surrounded with the strictest antiseptic precautions to prevent a single stray germ of *bacillus subtilis* or *bacterium termo* lighting in it from the circumambient air. Amid such conflicting tides of sciolism, meeting from opposite points of the compass and forming a turbulent maelstrom at their place of encounter, it taxes the coolest judgment of the sanitarian to steer a middle course—"Incidit in Scyllam qui vult vitare Charybdim"—and it is little wonder that the average layman, even of the more intelligent class, either obstinately resents all efforts to deter him from slow suicide, or lends a superstitious ear to the miracle-mongering of the "Faith-curists" and an ignorant voice to the crazed fanaticism of the "anti-vaccinationists" and "anti-vivisectionists."

To guide the bark of Preventive Medicine "*in medio tutissimus*," it is manifest that we must first dispel the mists of ignorance—not merely of the dense ignorance of utter illiteracy, but of that "little learning" which "is a dangerous thing" because of its one-sided superficiality. We have to deal, not only with the uninformed or misinformation of the lower classes, but with that of legislators, of governmental departments, and of the medical profession; and, if I have made clear my fundamental proposition that all the superstructures of public sanitation must be built upon the laws of personal hygiene, it follows, as the day the night, that the needed enlightenment must originate in our own guild. The physician is brought into advisory relations with every class of the community; upon the soundness of his views depends to a great extent the popular sentiment in all matters relating to the "*salus populi*"; as is the seed sown by our medical schools, so will be the harvest of public health.

How have these schools fulfilled their mission in this respect? I grant willingly and admiringly that many of them afford com-

plete facilities for learning—if the pupil have the ambition and the capacity to learn; that their faculties comprise teachers as deservedly eminent in their several specialties as can be found the wide world over; but, in the downward competition forced upon them by legislative laxity, all the higher range of professional education beyond the merest rudiments is optional with the student, and matriculants are admitted with less preliminary training than would be required of a retail grocer's clerk. In England, where—and indeed with some justice—it is declared that the minimum standard of medical education is not yet high enough, the regulations of the General Medical Council require a preliminary examination in English grammar and composition; mathematics, including the elements of algebra and geometry; elementary mechanics of solids and fluids; and one, at least, of several optional subjects, embracing botany, zöology, and elementary chemistry. In our own country, the Johns Hopkins University has established a still higher curriculum preliminary to the study of medicine, demanding from its matriculants a sound general academic preparation, and leading them through the paths of physics, chemistry, and biology, by which alone the inner temple of physiology can be reached.

I shall not insult the intelligence of an audience such as I now address—among which are many leaders of professional opinion, and teachers whose names are identified with medical progress—by arguing the necessity of a scientific preparation for medical education. This Association has for its very reason of being the resolve to guard the dignity of our profession against the incursions of charlatanism or dishonest pretense, and I am sure that we all alike deplore any untoward circumstances which may even temporarily lower the standard under which we rally. But all the more does it behoove us to watch for any relaxation of discipline in our own ranks, and to see to it that our own forces are better drilled than those of the “adjectived” sects which we repel. Let us, then, like prudent defenders of a fortress, look if there be any breaches in our walls pregnable by our assailants. In pursuance of the duty assigned to me, I shall for the present confine my round of inspection to the

somewhat vulnerable bastion which I have lately been endeavoring to hold under rather unfavorable conditions as regards garri-son and commissariat.

There are potentially thirteen hundred local boards of health in this State, nearly all of which are now more or less actively operative; and, as I suppose most of my hearers know, it has been decided that the health officers of all these boards (since the Public Health Act declares that they must be "competent" physicians) come under the Civil Service rules, and are subject, at the least, to non-competitive examination. The questions for this purpose—in view of the lack of hygienic tuition in our colleges—have been confined to the rudiments of a health officer's daily duties, avoiding scientific technicalities, and calling for no more special knowledge than a second-course medical student with an ordinary common-school education ought to possess. But the answers to them—of which many have been referred to me—constitute an arraignment of our educational corporations indefensible, except upon the dubious plea of an "alibi." Of course, there are many honorable exceptions; even in distant rustic regions are to be found men of scholarly attainments and ripe judgment, and I may truly say that several of the best informed health officers in the State are in rural townships, the names and locations of which are unfamiliar outside of the Post Office Department. But these are in spite of, not because of, the requirements of our medical schools. I have seen an excellent examination paper, showing thoughtfulness and sound information, and couched in terse and grammatical language, by a candidate whose medical diploma was granted by a homœopathic college; on the other hand, I have read with dismay that a graduate of a reputable "regular" medical school would deem it advisable to disinfect the intestinal discharges "from Typhoid and Tyfus feavers by properly having all excreta buried at once by using plenty of lime"; and the same gentleman, to distinguish epidemic from endemic disorders, remarks simply that "Epidemic Diseases has a tendency to spread like the Small Pox in Montreal at the present time." In this connection it may be observed that not more than about ten per cent of our gradu-

ates, as represented in the noble army of applicants for the position of health officer, have any definite views concerning the incubation-period of variola, or the remotest conception of the normal course of the vaccine vesicle, which several of them define as the "kind poek." To a question touching the minimum space to be allotted to each person in a sleeping apartment, the answers received have ranged from ten cubic feet—the content of a good-sized coffin—to ten thousand cubic feet, which would permit three inmates for a rather large three-story city house. To a somewhat similar interrogatory concerning the number of pupils who should be admitted to a school-room containing eight thousand cubic feet, the replies vary from fifteen to ninety-five, and in only three of the papers that I have seen is any reference made to the provisions for ventilation as modifying the conditions of the problem. As regards the average daily consumption of water per capita to be considered in relation to public water-supply for a city or village, one gentleman fixes it at half a gallon, and from this minimum many estimates unreasoningly vary up to more than a hundred gallons. Among the endemic maladies attributable to a high level of the ground-water, a moderate number of nominees have thought of mentioning malarial fevers, and two or three have known enough of Bowditch's and Buchanan's researches to allude to the association of pulmonary consumption with soil-saturation; but most of them have incongruously grouped under this head the contagious zymoses, such as small-pox, scarlatina, etc. I could continue the list of lamentable deficiencies almost *ad infinitum*; but let it suffice to say that, even among those whose clinical experience in the treatment of disease has doubtless rendered them trustworthy practitioners, the majority betray a very limited acquaintance with the laws of health, while far too many manifest an entire dissent from the ordinarily accepted rules of orthography and syntax, and an ignorance of elementary arithmetic, as exemplified in the answers to a few simple questions about the calculation of death-rates, which would cast discredit on the lowest form in a primary school. And be it not supposed that these monumental exhibitions of incapacity emanate altogether

from "irregular" schools of homœopathy or "eclecticism," or from such erratic concerns as those conducted by the convict Buchanan, in Philadelphia, or the detonating Boanerges who, failing to override the Regents of the University by means of a special charter from the Legislature, has allied himself with the great philozooist in a crusade against the prevention of small-pox. We can not lay this flattering unction to our souls; we can not even ascribe the admitted shortcomings to the ill-equipped and scantily supported colleges which, perhaps, a few of us may be inclined to stigmatize as "provincial." If comparisons were not odious, and if my lips were not sealed officially, I could demonstrate that, in the matter of preliminary and professional qualifications, our largest American colleges—even our illustrious metropolitan schools—show no better average than some of the more modest institutions which, with less emolument, honestly endeavor to do the best with the very raw material presented to them. How far this dead level of infra-mediocrity may be concerned in the "new-code" or "no-code" movement to break down all barriers I have no present desire to discuss. But, as the late Mr. Tweed sententiously remarked, "What are you going to do about it?" Shall we passively wait until the public loses its asinine patience and stamps its clumsy hoof upon our arcana, or have we a right to demand that entrance to the most learned of professions shall only be accorded to those who are fitted to acquire its mysteries? Already the air is filled with mutterings of a "State examination" in medicine—a method wholly impracticable under our political system. Will our schools await this annihilating indignity, or will they prove—as they can—that a scientific medical education renders sectarianism in practice impossible; that the art of medicine means the clinical application of numerous collateral branches of knowledge, and that the physician who is worthy of his title must scorn to prefix any qualifying adjective thereto?

As my theme is limited to public medicine, let us for a few moments consider the requirements of this department of our profession. I have already rehearsed the moderate desiderata for matriculation in professional studies in England; but I have

not yet added that in the ordinary medical course—which there occupies at least four years—hygiene, by the recommendations of the General Medical Council, bears an essential part. In addition to this, most of the licensing corporations grant, on special examination, a special diploma or certificate in Sanitary Science, or, if medical jurisprudence be included, in “State Medicine.” The subjects embraced in such examinations are, in general terms: Elementary Physics, as regards the application of hydraulics, hydrostatics, and pneumatics to water supply, drainage, sewerage, and ventilation; Chemistry, as applied to at least qualitative analyses of air, water, and food, and the ability to interpret correctly the quantitative analyses of chemical specialists; Microscopy in its relation to food, air, and water; Elementary Geology in connection with drainage and water supply; Meteorology in its sanitary bearings; the causation, propagation, and control of epidemic, endemic, epizootic, and communicable diseases; a rudimentary knowledge of sanitary laws and of the computation of vital statistics; practical sanitation in relation to hereditary, developmental, domiciliary, industrial, dietetic, and other etiological factors; in brief, the very alphabet of the art of preserving health. The schedule, at first sight, and on this side of the Atlantic, may seem formidable; but I confidently ask this audience if there be many items in it which the educated physician ought not to know for the benefit of his private patients?

In legislation we have—aside from the scant admixture of educated statesmen—two classes of obstructives: the wholly ignorant demagogues who neither know nor care for aught beyond the petty machinery of partisan politics, and those who have sipped just enough at the Pierian spring to regard “*omne ignotum pro mirifico*” and to imagine that analytical investigation can determine quantitatively all the heterogeneous ingredients of an unknown compound, or that every smatterer in science is competent to lay down dogmatic generalizations. We, who are cognizant of the insufficiency of positive scientific evidence concerning the dietetic or medicinal value of alcohol, must be amused by an enactment decreeing that the pedagogues of

our public schools shall teach physiology with especial reference to the effects of spirituous beverages; but we must admit that the plan was prompted by a praiseworthy though ill-informed motive to suppress the evil of intemperance. We have seen a well-meant anti-oleo-margarine act passed, in ignorance of the fact that four fifths of the population of the world use "other oleaginous substitutes for butter," and that, from a sanitary point of view, the rancid, over-salted, and water-soaked products of some of the bucolic dairy farmers whom the law was designed to protect are quite as objectionable as the trade-frauds which it was intended to prohibit.

One of last winter's contributions to sanitary legislation—based upon the postulate that the health of the people is materially dependent on hops—directs that a chemical analysis shall be made of samples of beer from every brewery in the State, to the end of determining if there be anything not "normal" therein; in blissful unconsciousness that there can be any difficulty in ascertaining whether a given percentage of alcohol was derived from the saccharization of the starch of barley, rice, or other grain, or from an admixture of glucose as such; or that the age of the beer and the condition of the initial "mash" have more to do with the wholesomeness than the employment of Indian corn or the addition of a few grains of quassia. Our Salernian mentors established a more practical criterion in their couplet:

*"Non sit acetosa cerevisia, sed bene clara,
De validis cocta granis, satis ac veterata."*

Our statute books contain many similar instances of well-meant enactments which fail to fulfill their purpose, through lack of accurate information on the part of their originators, and disinclination to seek competent advice. In fact, there seems to be in the mind of the "practical man"—particularly if he have the additional qualification of being "self made"—an inherent and insuperable animosity to what he calls scientific "theorizing," and an undying determination to extend his autogenetic sway over "*omnibus rebus et quibusdam aliis*," quite

unprejudiced by any previous knowledge of the principles which he undertakes to put in practice.

It is ignorance of this sort which has placed public positions, demanding special professional acquirements, on a par with purely political offices as regards brief tenure and rotation. No "Civil Service Reform" can assure the safety of the community in such respects which does not involve the well-advised selection of the fittest and his retention "*quandiu se bene gesserit*." Preventive medicine is a career of progressive research, not a temporary by-play to be assumed by the first comer at a day's notice and abandoned after a few months of tentative apprenticeship. A public benefactor like John Simon could never be developed under a system of successive appointments for terms of two or three years. Here, from the most important sanitary post in the world—that of the Health Officer of the Port of New York, whose transitory term is only casually prolonged by some political difficulty in confirming his successor—down to the rural health officers who, with miserably insufficient remuneration, may be changed each year, we are periodically casting away the fruits of practical experience and the opportunities of advancing our knowledge, and beginning again *de novo*. Our public health act in this State provides a theoretically perfect machinery through the local boards of health, with the State board as an advisory and controlling center; but its beneficent operation is retarded by the lack of stability and the continual necessity of indoctrinating new incumbents in unaccustomed duties.

The urgent question always asked by the many-headed public, whose elective voice governs all corporate expenditures, is, "Does it pay?" and this question, as regards sanitary improvements, may be unhesitatingly answered in the affirmative, with full assurance that no other form of investment will yield as rich a return. Scores of recorded examples, where a reduction of from twenty to thirty per cent in the mortality has been effected by such improvements, justify the opinion of most statisticians that the average death-rate might be easily diminished to or below 15 per 1,000. Our returns are still too far from

complete to warrant a positive statement of our mortality, but the ratio in this State is probably rather over than under 20 per 1,000, and with an estimated population of 5,500,000, such a diminution—taking the lowest pecuniary estimate of the value of life—would save to the community \$27,500,000 per annum. From the standpoint of our actual returns of preventible deaths, I have elsewhere shown¹ that with a minimum calculation of the proportion of illness to fatal cases, and a liberal allowance for the mortality at non-productive ages, the prevention of but a moiety of this disease and death would pay six per cent on an investment of nearly \$170,000,000. Professor de Chaumont, in a recent address before the Sanitary Congress at Leicester, stated, as the result of the admirable hygienic management in the British army, that “thirty years ago the soldiers at home died at the rate of 18 per 1,000, whereas now the rate is only 6.28”; and even among the general population, in countries where sanitary measures have been fostered, nearly seven years have been added to the average duration of life.

Surely, such results as these are worth paying for, especially when their cost, at the highest, is but an infinitesimal fraction of their profit. But, to attain even greater results, we must ourselves bear in mind, and impress upon the public, that we have yet much to learn which can only be learned through the abstract scientific investigation which our “practical” politicians are wont to decry as superfluous extravagance. To preserve health we must by patient and laborious research discover more than we yet know of the causes of disease. Even in the apparently most demonstrable advance of micro-pathology, we are still uncertain how the “pathogenic” microphytes perform their mischievous mission; whether by some intrinsic property of their own, or by inducing, through their reaction on their environment, a “*tertium quid*”—a chemical product allied to the “ptomaines”; and we are, consequently, far from a satisfactory

¹ “Introduction to Fifth Annual Report of the State Board of Health of New York,” pp. 8, 9. The figures there given are based on the returns for only nine months; the present computation is extended to cover an entire year.

agreement touching preventive methods against the infections which they represent.

But to attempt to point out the as yet only partially cultivated regions of sanitary science would much transcend my time and your patience. The hour for luncheon is drawing near and reminds me of another Salernian apophthegm—

“Inanis venter non audit verba libenter ;”

so that I shall not weary you longer. I am conscious that my most finished effort in so wide a field would need your indulgence ; but I feel that particular apology is due for this hurried paper, written at chance moments, amid the constant pressure of official duties.

